

## **HIGH RELIABILITY SOLDER JOINT WITH MULTILAYER STRUCTURE**

### **ABSTRACT**

**[032]** Disclosed are high reliability solder joints and methods for manufacturing the same. Methods are disclosed forming a solder joint (26) in an electronic assembly (10) having one or more copper connection sites (16) including steps for applying a nickel layer (22) with a carefully controlled thickness to the copper connection site (16), and applying a diffusion layer (24) to the thin nickel layer (22). Further steps are disclosed for positioning lead-free solder (18) adjacent to the diffusion layer (24), and for reflowing the solder (18) to form a highly reliable solder joint (26). Also disclosed is a solder joint (26) for use in a semiconductor apparatus (10) having at least one copper connection site (16). The solder joint (26) includes a thin intermetallic compound layer (28) bonded to the copper connection site (16) and lead-free solder (18) encapsulating the thin intermetallic compound layer (28).